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ABSTRACT

The general proposition of attachment theory is that attachment is grounded in an independent, biologically based system. The quality of primary attachment relationships strongly influences a child's early personality organization, particularly the concept of self and others. The theory emphasizes the primary status and biological function of intimate emotional bonds between individuals. The theory postulates that intimate bonds are controlled biologically and use internal working models of the self and the attachment figure in relationship with each other. This doctoral research paper critiques recent research on attachment and discusses the implications of secure and insecure attachment of infants to their caregivers. Section 1 provides an overview of attachment theory. Section 2 critiques the methodology of attachment research and identifies common methodological problems. Particular attention is given to strange situation methodology and its alternatives. Section 3 reviews empirical literature that describes correlates of secure and insecure attachments in infancy. Discussion focuses on predictive hypotheses and correlates of secure attachment. A total of 53 references are cited. (RH)

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PREDICTIVE IMPLICATIONS OF SECURE MOTHER-INFANT ATTACHMENTS

A Doctoral Research Paper

Presented to

the Faculty of the Rosemead School of Psychology

Biola University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Psychology

by

Judith Lynn Hunt

May 1990

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PREDICTIVE IMPLICATIONS OF

SECURE MOTHER-INFANT ATTACHMENTS

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ABSTRACT

PREDICTIVE IMPLICATIONS OF
SECURE MOTHER-INFANT ATTACHMENTS

by

Judith Lynn Hunt

Attachment researchers study the attachment between mothers and infants in order to determine the correlates of a secure attachment. Researchers test infants' attachment to their mothers by observing their interactions through a methodological procedure called the Strange Situation. Securely attached infants seem to manifest an early positive, interactive relationship with their mothers. They have mothers who are responsive to their needs and supportive of their striving toward autonomy. Securely attached children were found to be more competent in exploring their environments, had more advanced cognitive development, and were more sociable with peers and strangers than insecurely attached children.

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Predictive Implications of Secure Mother-Infant Attachments

Introduction

The study of the attachment between infants and mothers has been avidly pursued in developmental psychology in recent years. Psychodynamic, psychoanalytic, and object-relation theorists and practitioners have long maintained that early life experiences and attachments with primary caretakers strongly influence one's subsequent adult relationships and vulnerability to psychopathology. Attachment theory and its corresponding research base seems to provide some empirical justification for the importance of early attachments.

However, one must be very careful to ensure that psychodynamic developmental theories concur with the empirical research on infants, as Daniel Stern (1985) warned in his book, The Interpersonal World of the Infant. Stern, a psychiatrist and infant researcher, suggested that there are contradictions between psychodynamic theories and recent observational infant research. He contended that contradictions occur because psychoanalysts "have made their inferential leaps on the basis of reconstructed clinical material alone, and in the light of older and outdated views of the infant" (1985, p.5). As with recent developments in observational infant research, it appears that it is also

necessary to adapt psychodynamic theories to align with the expanding body of attachment research.

This paper critiques some of the recent attachment research and discusses the predictive implications when infants have secure rather than insecure attachments to their caregivers. The first section includes an overview of attachment theory and its origins. A second major section critiques the overall attachment research methodology along with common methodological problems. The empirical literature describing correlates of secure and insecure attachments in infancy is discussed in the third major section.

Attachment Theory

Attachment theory is an attempt to understand the complex process of attachment that exists primarily between infants and mothers. Attachment theorists and researchers devote their energies to seeking objective proof or disconfirmation of the underlying assumptions of the theory. According to well-known attachment researcher, Mary Ainsworth (1989), "The great strength of attachment theory in guiding research is that it focuses on a basic system of behavior--the attachment behavioral system--that is biologically rooted and thus species-characteristic" (p.709). She claimed that attachment researchers search for basic and common developmental processes of human functioning, despite individual differences.

Historically, attachment theory was formulated by John

Bowlby who was a psychoanalyst out of the object-relations tradition. It has roots in ethology, control theory, cognitive psychology and evolution (Bowlby, 1988). Bowlby became interested in ethology and was fascinated by Lorenz's (Bowlby, 1969/1982) work on imprinting in newborn goslings, a phenomenon by which the infant birds attach themselves to the first moving object they see. Ethological ideas gave Bowlby a biological basis for his belief that children need a reliable ongoing attachment to a primary caregiver, and that they suffer grievously, or irreparably if that attachment is interrupted or lost. Bowlby was the first theorist to combine cognitive and emotional development, and to build a bridge between Piaget and Freud. His three volume work, Attachment and Loss (1969/1982,1973,1980), attests to the fact that he is the undisputed father of attachment theory.

The general proposition of attachment theory is that attachment is grounded in an independent, biologically-based system. In addition, a major emphasis is that the quality of primary attachment relationships strongly influence a child's early personality organization, particularly the child's concept of self and others. A second major emphasis of attachment theory is the primary status and biological function of intimate emotional bonds between individuals. Intimate bonds are postulated to be controlled biologically and utilize internal working models of the self and the attachment figure in relationship with each other (Bowlby, 1988).

The word attachment as used by Bowlby and subsequent researchers refers to a fundamental form of behavior that results in attaining or maintaining proximity to another clearly identified person. It differs from a social bond or all other behavioral interactions that occur between a parent and child (Bowlby, 1988). Attachment also refers to an internalized psychological organization that exists within the individual. The disposition to become attached is an independent system, built into primate biology to ensure survival. It has its own distinct motivation that requires no energy or instinct other than that which is part of all living systems. The attachment system refers to the complex set of behaviors, feelings, and ideations which exist between two attached persons. The goal of attachment is to regulate behaviors in order to maintain or obtain proximity to and to make contact with an attachment figure (Bowlby, 1969/1982).

Regardless of how they are treated, all infants will be attached to their available caretakers, according to the theory. Bowlby (1969/1982) affirms that the quality of the attachment is central and is more important than the presence of a caretaker, or the strength of the attachment. If an infant experiences reliable and responsive caretaking, the infant will have confidence in the availability of care and ultimately develop a deep inner sense of self-confidence and self-worth. Disruptive or unresponsive care in infancy may lead to long-lasting insecurity and anxiety regarding close relationships. Bowlby (1969/1982) underscored the centrality

of the caregiver's responsiveness to infant signals and the importance of availability for the enactment of the infant's attachment system. The attachment figure is seen by infants as able to provide comfort, security, and strength, while enabling them to perceive the world as manageable. Quality caretaking also involves the provision by both parents of a secure base from which a child can "make sorties" into the outside world, and explore the environment (Bowlby, 1988).

Bowlby (1973) likewise suggested that attachment plays a role beyond infancy. He states that attachment behavior is most easily activated before the age of 3, but attachment behavior may also occur in adults, among relative equals such as strong friendships and romantic relationships. Early attachment affects adult functioning in a significant fashion. The infant forms internal representations both of the self and of others through repeated transactions with attachment figures. These "internal working models" subsequently form a heuristic basis for future relationships (Bowlby, 1973). For example, a child neglected by mother in infancy may have formed a model of the self as being unworthy of the attention of others and a model of others as being inaccessible and unresponsive. These fundamental assumptions about the self and others are resistant to change and each new relationship may re-stimulate the original mother-infant bond. As an adult, the individual may believe that others are also inaccessible and uncaring like mother; thus, repeating the original attachment pattern (Bowlby, 1980).

In summary, attachment theory originated with Bowlby and attachment researchers seek empirical support for the basic tenets of his theory. Researchers attempt to measure the quality of a child's attachment relationship and observe corresponding behaviors in order to understand the attachment system that exists between two persons. The following section will discuss some of the methodological issues and problems that attachment researchers encounter in their efforts to advance the understanding of attachment behavior.

Methodology

The Strange Situation

The main methodological procedure for testing the quality of attachment in the attachment research is the "Strange Situation" (Ainsworth, Blehar, Waters, & Wall, 1978). The Strange Situation involves the observation of infants in an unfamiliar setting and classifying them based on their interaction with their mothers.

The Strange Situation was developed by Ainsworth and Wittig (1969) for use in a longitudinal study of attachment in a Baltimore sample. It was designed to assess 12- to 24-month-old infants and their relationships to their mothers during a series of brief separations and reunions. It consists of eight specific episodes presented in a standard order that last approximately 3 minutes each (except for the first) unless the infant is more than mildly distressed. The episodes are as follows:

> An infant and mother are brought into a comfortable laboratory room; a stranger enters and sits talking to the mother and then to the infant; the mother leaves the room unobtrusively; the mother returns and the stranger leaves them together; the mother leaves the infant alone in the room; the stranger returns; the mother returns once more. (Ainsworth et al., 1978, pp.6-7)

The infant is exposed to increasingly stressful episodes, thus serving to elicit attachment behaviors. The procedure attempts to provide a standardized context in which attachment and exploratory behavioral systems can be assessed.

The sessions are videotaped and are later scored on two levels. One level identifies and rates the occurrence of specific categories of infant behaviors. The interactive categories include scales of proximity and contact seeking, contact maintaining, resistance, avoidance, search during the separation episodes, and distance interaction with both the mother and the stranger. Special emphasis is placed on the reunion episodes with the mother.

The infant's reunions with the mother are thought to measure the degree to which the infant's "working model" of the mother provides feelings of security or trust. Theoretically, the securely attached infant should be able to use the mother as a secure base for exploration and as a security in times of danger. On the other hand, the insecurely attached infant is unsure whether the mother can be trusted to provide security, and thus may avoid or resist the mother's ministrations.

Judges use the interactive category ratings to classify

the attachment relationship at the second level of scoring. Infants are classified into one of three groups. Infants classified as (B) are said to be securely attached and reflect a behavioral pattern of seeking proximity and contact with the mother, especially in the reunion episode, and use the mother as a secure base in which to explore the environment. Infants classified as (A) or (C) are labeled as having insecure attachments. Those classified as (A) are labeled avoidant because they tend to demonstrate a conspicuous avoidance of proximity to the mother during play and avoid interaction with the mother in the reunion episodes. Infants in the (C) classification are labeled resistant or ambivalent because they mix contact-seeking with angry rejection of the mother, do not play independently, and tend to be fairly inept in handling the stresses presented by the Strange Situation (Ainsworth et al., 1978).

These three main groupings are further divided into eight subgroups which reflect different behavioral patterns within the attachment classifications. This paper is concerned with infants in the secure subgroup classification: B1, B2, B3, B4. Infants in all of these subgroups desire interaction with their mothers, but they differ according to their desire for physical contact, distress in the separation episodes, and preoccupation with their mothers during the Strange Situation. The secure infants range on a continuum with subgroup B1 infants seeking the least amount of physical contact with their mothers and showing the least amount of distress in the

separation episodes. B1 infants are followed by B2, B3, and finally, B4 infants. B4 infants desire the most contact with their mothers, show the most distress during separation from them, and are more preoccupied with their mothers during the Strange Situation, than the other B subgroup infants. Some attachment researchers (Lamb, Hwang, Frodi, & Frodi, 1982; Thompson & Lamb, 1983; Van IJzendoorn & Van Vliet-Visser, 1988) utilized the subgroups in their studies. They achieved statistically significant results by combining various subgroups.

The Strange Situation has been widely acclaimed, on one hand, because it seems to have enabled researchers to identify and measure the central theoretical construct, the quality or security of the mother-infant attachment. Through the Strange Situation procedure, researchers have appeared to confirm Bowlby's theoretical assumption about the centrality of the infant-caretaker relationship.

On the other hand, the popularity of the Strange Situation procedure is due in large measure to the pervasiveness of claims regarding its validity and reliability. The major evidence for its validity is derived from two bodies of studies. One group is concerned with the relationship between Strange Situation behavior and subsequent behavior of the infant in a variety of settings, or the predictive validity of the parent-infant attachment. Individual differences in the security of attachment appear to predict individual differences in other aspects of

socioemotional development. This paper primarily focuses on the predictive literature. However, before returning to this focus, other aspects of the Strange Situation methodology, including a critique of the procedure, is considered.

The second body of research is concerned with the relationship between prior parent-infant interaction, or parental behavior and subsequent Strange Situation behavior. This latter group constitutes the main basis for claiming that the Strange Situation assesses the quality of the infant-parent relationship. The Strange Situation is thought to measure the central hypothesis that securely attached infants have more sensitively responsive caretakers than insecurely attached infants. This hypothesis was primarily developed out of the pioneering longitudinal study by Ainsworth et al. (1978) in Baltimore in which she first utilized the Strange Situation. She details evidence in support of the procedure's external validity.

Critique of the Strange Situation

Although it is still widely utilized in attachment research, in recent years the Strange Situation has been scrutinized and criticized as an assessment technique. Michael Lamb is the most prolific and comprehensive critic of the Strange Situation procedure, of the underlying theoretical assumptions of the Strange Situation, and of the results and implications derived from the attachment research. Lamb wrote a controversial article with Thompson, Gardner, Charnov, and Estes (1984) challenging the Strange Situation procedure.

They followed the article with a book, Infant-Mother Attachment: The Origins and Developmental Significance of Individual Differences in Strange Situation Behavior (Lamb, Thompson, Gardner, & Charnov, 1985) which contains an exhaustive review and critique of the attachment literature.

One major criticism of the Strange Situation involves its reliability. There are few subsequent reliability studies that confirm Ainworth's Strange Situation procedure and hypothesis that securely attached infants have more responsive caretakers than insecurely attached infants. Furthermore, Lamb et al. (1984) questioned Ainsworth's interpretation and the generalizability of her original results. They particularly challenged her hypothesis and stated that her findings are considerably weaker than they appear. They suggested that her hypothesis was derived only after an examination of the data and therefore, must be replicated before it can be considered reliable.

Lamb et al. (1984) emphasized that despite differences in infant behavior, the mothers of avoidant and resistant babies differed less from each other than they did from the mothers of secure babies. Because of an absence of clear differences between the groups, they claimed that Ainsworth's conclusion that Strange Situation behavior is determined by prior patterns of infant-mother interaction is unsubstantiated. They also asserted that Ainsworth overinterpreted and overgeneralized small differences between tiny groups. Among other points, they also stated that she failed to control for

bias and thus, Lamb et al. (1984) believe that her Baltimore project should be viewed solely as a hypothesis-generating pilot study and not as a hypothesis-testing investigation.

Lamb et al. (1984) also criticized the generalizability of Ainsworth's original study since it has not been replicated in independent studies in which bias is controlled and a priori predictions are tested and verified. In assessing other follow-up studies (e.g., Egeland & Farber, 1984; Grossmann & Grossmann, 1982) Lamb et al. (1984) found that overall, the empirical evidence regarding the antecedents of Strange Situation behavior is quite weak. They asserted that the studies provide little evidence concerning the specific dimensions of maternal behavior that are important and that there is little direct empirical support for Ainworth's hypothesis that securely attached infants have more responsive, sensitive caretakers than insecurely attached infants.

A second major criticism of the Strange Situation is its limited age range (12 - 18 months). This is particularly problematic for research of attachment theory that calls for multiple assessments or for assessment of developmental change. Repeated assessments must be spaced to prevent strong carryover effects so there is limited time in which to utilize the Strange Situation (Waters & Deane, 1985). In addition to the limited age range, Goldsmith and Alansky (1987) have also questioned the applicability of the Strange Situation to all children. They speculated that more than two separations (the

standard procedure) may be necessary to activate attachment in children with high fear or anger thresholds. Therefore, for some children, the Strange Situation may not be an accurate measure of their true attachment pattern. In general, Goldsmith and Alansky (1987) believe that temperamental variables in children must be considered in assessing attachment.

A third criticism of the Strange Situation is that it is an unnatural laboratory procedure with forced interactions between mothers and infants which are not representative of what naturally occurs between them in the home environment. Field (1987) suggested that one must observe how the mother and infant interact during natural, nonstressful situations, and that it is not clear what is being tapped by the Strange Situation.

Ainsworth (1978) described her reasons for developing the Strange Situation in the laboratory rather than observing infants in their home environment. She wanted to create a stressful situation in order to test attachment, and her study of Baltimore infants at home demonstrated that infants did not show enough fear to activate attachment patterns in the familiarity of their homes. Ainsworth et al. (1978) also describe the superiority of the Strange Situation over natural observation because the laboratory procedure takes less time than home observation. According to Ainsworth et al. (1978), the Strange Situation is comparable to a natural, daily-occurring separation such as the mother leaving the child with

a neighbor to do some quick shopping.

Goossens, Van IJzendoorn, Tavecchio, and Kroonenberg (1986) tested children in both the home and laboratory, alternating the context between sessions and comparing their attachment patterns, to determine if assessment of the quality of the relationship could be accurately measured in the home. They found that the home procedure seems to be stressful enough to activate attachment behavior, in contrast to Ainsworth et al. (1978). Goossens et al. (1986) also found differences between the laboratory and home attachment patterns and believe the two situations measure slightly different constructs, perhaps because of the child's different interpretations of the two situations. In any event, they concluded that the results of the home and lab attachment behavior remain noncomparable. The test-retest reliability of the interactive scores and the stability of the classifications were high when measured in the laboratory. Their results lend support to the conclusion of Ainsworth et al. (1978) that the quality of attachment can be reliably measured in the laboratory by the Strange Situation.

Gaensbauer et al. (1985) likewise tested infants in the Strange Situation to determine if it was possible to make inferences about the quality of caretaking infants receive in the home environment from the structured laboratory setting. Their results indicated that attachment behavior in the laboratory can confidently be used to make inferences about caretaking in the home environment when an infant manifests a

consistent and unambiguous attachment pattern. Gaensbauer et al. (1985) warned that inferences about the long-standing qualities of caregiving must be made with caution when infants display inconsistent or ambiguous attachment patterns. In sum, recent studies support the assumption of Ainsworth et al. (1978) that the Strange Situation appears to be a reliable measure of a child's attachment patterns in the home environment, especially when the attachment patterns are clear and consistent.

A fourth criticism of the Strange Situation procedure was derived from cross-cultural studies that have shown that the distribution of infants across attachment classifications is not consistent with that of American infants (Lamb et al., 1985). Cross-cultural results have raised the question that national group differences in infant temperament and child-rearing patterns may be unrelated to parental sensitivity. Researchers such as Lamb et al. (1985) wondered to what extent factors other than maternal sensitivity may also affect American babies and the Strange Situation behavior.

Lamb et al. (1985) assessed most of the cross-cultural studies using the Strange Situation and concluded that the distribution of infants among the avoidant, resistant and secure attachment classifications varies markedly across cultural contexts, particularly among the avoidant and resistant infants. Lamb et al. (1985) also concluded that this distribution not only varies between cultures, but also within cultures with different distributions of independent

samples in Israel, West Germany, and Japan, for example. Lamb et al. (1985) stressed that cross-cultural studies demonstrate that similarities in Strange Situation behavior do not necessarily imply that the behavior has the same origins or meaning in different cultures. They suggested interpreting differences between attachment classifications and Strange Situation behavior found in cross-cultural studies as influenced by cultural norms.

Grossmann, Grossmann, Spangler, Suess, and Unzner (1985) stated that in the United States, there are less frequent avoidant and resistant infant classifications than in other countries. The avoidant and resistant attachments in the United States may prove a more reliable measure of insecure relationships than in other countries. They asserted that although the Strange Situation has been utilized by a number of researchers, it is nevertheless a shortcut method that has limitations in cross-cultural work. They stressed the importance of thorough descriptions of the development of attachment patterns in the context of cultural values and practices in order to fully understand attachment relationships. Thus, they agreed with Lamb et al. (1985) that cross-cultural research using the Strange Situation must be conducted carefully and that results must be interpreted according to the cultural context.

Although the Strange Situation is the most popular assessment tool in attachment research, some researchers have expressed the need for better methods to be utilized in

attachment research. Field (1987) addressed the danger of the Strange Situation paradigm as an absolute standard for measuring attachment behavior. She asserted the importance of developing a paradigm that would tap the complexity of attachment behavior in both stressful and nonstressful situations. Goldsmith and Alansky (1987) also explained that convergent validation for the Strange Situation is lacking due to the dominance of that methodological procedure for assessing attachment.

Alternatives to the Strange Situation

Waters and Deane (1985) listed alternative conventional assessment methods that are also utilized in attachment research. One method is trait ratings that are particularly advantageous because they are flexible and economical. They are sensitive to coherence over time and to behavioral changes. Rating methods employ human judges to summarize and scale diverse behavioral input according to a theoretically defined criterion. The primary disadvantages of rating methods are that they tend to lose behavioral details on which the ratings were based, and they are subject to bias, response sets, and global rating styles. Ratings tend to interpret data rather than present observations which allow for different alternative explanations.

Another major method utilizes observations scored in terms of frequency counts and time sampling (Waters & Deane, 1985). The primary advantage is that such observations retain much of the behavioral detail that is sacrificed in rating

methods. Unfortunately, they are expensive to employ. Observations can provide important, sensitive data if categories are tailored to the design of the behavioral system. In practice, however, many observational scoring schemes are insensitive and group broad ranges of behavior together. The inherent potential in using observational data is rarely realized in developmental research. This may be because of a lack of conceptual analysis and unfamiliarity with target behaviors. In addition, time sampling and frequency counting take skill, patience, and endurance, so many researchers opt for traditional methods such as the Strange Situation.

Waters and Deane (1985) suggested that the Q-sort method which has been used extensively in personality assessment and developmental research holds considerable promise for assessing attachment relationships. It consists of three components: procedures for developing sets of descriptive items for assigning scores, procedures for sorting scores into a rank order, and procedures for data reduction and analysis. Waters and Deane (1985) developed an Attachment Q-set and tested it in several studies. They found that the method meets standards for assessing attachment from an ethological and control systems perspective. It provides behavioral detail and context specification and seems well suited to the task of examining relationships with affect, cognition, and behavior in the attachment domain. It lends itself to analyses of both quantitative and qualitative developmental

change. The Attachment Q-set is presently being developed and may become in the future a viable alternative assessment methodology to the Strange Situation. Correlations with the Strange Situation have not yet been published.

Infant Attachment Research

Predictive Hypotheses

As mentioned previously, part of the Strange Situation's popularity is due to claims that it predicts important aspects of a child's behavior as much as several years later. Predictive attachment research attempts to describe the relationship between the Strange Situation attachment patterns and subsequent behavior, or explain the predictive implications of mother-child attachments. This research has attracted much attention since few assessments of infant characteristics have impressive predictive validity.

In a recent article Lamb (1987) addressed the predictive implications of individual differences in current attachment research. This article follows a chapter by Lamb, Thompson, Gardner, and Charnov (1985) that critiqued the predictive validity of Strange Situation classifications. Lamb et al. (1985) compiled a thorough review of the predictive literature, and though they established documentation for Strange Situation behavior, they systematically emphasized the weak empirical support for its predictive validity. Goldsmith and Alansky (1987) conducted a meta-analysis and found that sensitive, maternal interaction predicted secure attachments.

However, in newer studies, the effect size was weak in terms of statistical significance. This corresponds with the conclusions of Lamb et al. (1985).

Lamb et al. (1985) gave a major reason for the weak empirical support for the Strange Situation's predictive validity. They complained that many researchers err by failing to think clearly about the appropriateness of specific dependent measures or their conceptual link to earlier patterns of Strange Situation behavior. These experimenters implicitly test the hypothesis that secure attachments presage better performance and adjustment than avoidant or resistant attachments. As mentioned previously, Lamb et al. (1985) viewed this as an untested and imprecise hypothesis that must first be proven before it can be utilized in the attachment research.

According to Lamb et al. (1985), two different hypotheses with corresponding assumptions underlie and guide the search for the predictive correlates of Strange Situation behavior. These two different hypotheses greatly affect the validity of the Strange Situation and the predictive implications of attachment patterns. Concerning the first hypothesis, theorists emphasize the formative importance of the quality of the parent-infant interaction during the first year in shaping later patterns of attachment. The infant internalizes these interactional patterns which are maintained despite disruptions in the child's environment. This theoretical position is held by major pioneering figures in the attachment

field.

The second hypothesis, proposed by Lamb et al. (1985), is that the effects of early parent-infant interaction are most likely to be evident when there is continuity in the quality of care and interaction. Lamb et al. (1985) suggested that the effects of early patterns of interaction are maintained by consistency in the quality of current care, rather than by internalized patterns. Thus, later effects may be attributable to either previous or contemporaneous influences. This second position implies that predictive validity can only be investigated and understood when one considers early formative influences, contemporaneous influences, and any intervening factors that may change the quality of care.

One important implication of Lamb's hypothesis is that as rearing conditions change, early influences may have little or no predictive value. Thus, the Strange Situation may simply reflect the current status of the parent-child relationship. If the status of the relationship changes over time, there may be questionable predictive validity for the Strange Situation assessment. The locus of stability is in the caretaking conditions, rather than in the infant--as assumed by the first hypothesis. Lamb et al. (1985) distinguished between these two different viewpoint asserting that the research is more consistent with the second hypothesis.

In an article on the predictive implications of the attachment research, Lamb (1987) highlighted three deficiencies in the available research on individual

differences. Firstly, he claimed that the association between Strange Situation behavior and subsequent child performance was weak and inconsistent. Secondly, the associations were obtained almost exclusively in studies with consistent (good or bad) stability in the caretaking circumstances. Thirdly, the studies, as a whole, have inadequate designs which measure attachment at one age and outcome at another age, resulting in ambiguous associations in the differences assessed. Lamb (1987) affirmed that the constructs of attachment and outcome must be assessed at both ages in order to conclude that it is differences in attachment that produce the different outcomes.

The paper now focuses primarily on the recent infant attachment research reflecting the antecedents of a secure attachment. Specifically, this includes correlates between certain infant or maternal characteristics and a later secure attachment with the primary caretaker, as assessed by the Strange Situation procedure. Correlates between a secure attachment and individual differences in various abilities and socioemotional areas will be discussed later in the paper. Special emphasis will be placed on Lamb's criticisms of the predictive attachment literature in reviewing the research.

Secure Attachment Correlates

Antecedents of Secure Attachments

In this first group of studies, researchers examined mother-child involvement to discover maternal or child characteristics that encourage the development of an infant's

secure attachment.

Child characteristics. Blehar, Lieberman, and Ainsworth (1977) studied 23 infant-mother pairs and found that infants later identified as securely attached were more responsive in early face-to-face encounters than infants judged to be anxiously attached. Securely attached infants were also more positively responsive to their mothers than to an unfamiliar figure, in contrast to anxiously attached infants. The securely attached infants also showed more smiling, "bouncing" and less fussing than avoidant or resistant infants.

Although the secure infants became more responsive to their mothers over time, it was the mother who initiated the majority of the encounters with playfulness and sensitivity to the infant's desire for contact. The infants whose mothers behaved thus in their early months tended to be rated more secure at the end of the first year than other infants. In contrast, mothers who were impassive and matter-of-fact during the face-to-face encounters were less likely to evoke a positive response from the babies. Their interactions tended to be brief, and their babies were later judged to be anxiously attached.

Blehar et al. (1977) appear to have controlled for biases using a variety of assessments which included the home environment, the laboratory, encounters with the mother, and episodes with a stranger. The face-to-face encounters were coded by five neutral assistants and precautions were taken to ensure the reliability of the observations. The behavior of

the stranger approximated the optimal stimulus for the response of infants in this age range. Therefore, the authors concluded that the differential behavior displayed by the secure group indicates a true discrimination and cannot be attributed to the mother's behavior. Also, Blehar et al. (1977) suggested that this was a hypothesis-discovering experiment rather than hypothesis-testing which further reduces bias. Overall, the experiment was thorough and their results appear to have reflected true correlates between a secure attachment and distinct infant characteristics that include positive encounters with their mothers.

Waters, Wippman, and Sroufe (1979) studied 36 Caucasian infants to test the hypothesis that a secure attachment relationship would also be associated with positive affective exchanges between the mother and infant in the absence of stress. A secure attachment was revealed by the ability to restablish contact following the stress of separation. They utilized the Strange Situation procedure and found that smiling was the only discrete behavior that significantly distinguished infants among the different attachment groups at 18 months.

Secure infants smiled at their mothers more than anxious or resistant infants, similar to the results of Blehar et al. (1977). The secure infants did not appear to vocalize, show, or give toys more to their mothers than infants in the other classifications. Ratings of affective sharing were clearly higher for the securely attached infants than for the

avoidant and resistant groups at both 18 and 24 months. The quality of affective sharing was rated by two blind raters and was described as an infant's broad smiling, accompanied by motor activity, laughing, rising inflection and enthusiasm along with verbal exchanges by the mother. Thus, Waters et al. (1979) concluded that securely attached infants display patterns of positive affective sharing both in the Strange Situation and during later free play, which distinguish them from anxiously attached infants. Waters et al. (1979) admitted that the differences between the secure and insecure groups were not as strong as expected, although their hypothesis was confirmed.

Other researchers also found infant or child characteristics that were correlated with a secure attachment in the Strange Situation. Easterbrooks and Lamb (1979) assessed 43 toddlers at 18 months and found that the most securely attached infants (in the secure B1 and B2 subgroups) were the most independent of their mothers in the Strange Situation. They engaged in more peer interaction compared with toddlers in the other classifications.

Pastor (1981) conducted a follow-up study to Easterbrook and Lamb (1979) and also included anxiously attached children. He tested 62 children and found that those who were securely attached were seen as sociable and related in friendly and cooperative ways with both peers and their mothers. The secure children more often complied with directions and had an overall more positive orientation to their mothers than the

anxiously attached children. In contrast to the Easterbrook and Lamb (1979) findings, the results of this study suggested that securely attached toddlers direct positive contact to both mother and peers. Both this study and that of Easterbrook and Lamb (1979) will be discussed further in a later section.

Londerville and Main (1981) observed 36 children at 12 months and again at 21 months in a study of cooperation and compliance. They found that children who were securely attached to their mothers complied with a greater proportion of their mothers' commands and prohibitions than insecurely attached children. Securely attached children evidenced internalized controls. Londerville and Main (1981) mentioned, however, that studies have not shown that securely attached children are generally more compliant than insecurely attached children.

In general, securely attached children, in contrast to insecurely attached children, were found to possess these characteristics when interacting with their mothers: responsiveness, smiling, affective sharing, independence, sociability, compliance with directions, commands and prohibitions, and internalized controls. There is an ongoing debate in the literature that centers on whether infant behavior in the Strange Situation is truly attributable to the nature of the relationship with the mother or simply reflects infant temperament. This paper does not consider the research on infant temperament.

Mother characteristics. Egeland and Farber (1984) attempted the largest replication of Ainsworth's (1978) original findings. They sought to discriminate among the three major attachment classifications to account for qualitative changes in attachment relationships. Their data included maternal and infant characteristics, mother-infant interactions, life-stress events, and family living arrangements. They studied 189 mother-infant pairs that were assessed at both 12 and 18 months. The mothers had previously received prenatal care through public assistance, and 40% of the mothers had not graduated from high school by the time their infants were born. The sample was racially representative.

The mothers of securely attached infants tended to be sensitive to infant needs and encouraged reciprocity. These mothers seemed to feel more positive about themselves and were observed to be more skillful in feeding and in playing with their infants than mothers of insecurely attached infants. They scored higher on the sensitivity and cooperation scales and were generally more responsive to their infants' cries from the beginning. The caretaking skills of pacing and timing were found to relate more to the development of a secure relationship than did the mothers' affective expression.

The mothers of resistant infants, on the other hand, were not rated as skilled or sensitive as the mothers of secure infants, although they were better than the mothers of

avoidant children. The mothers of avoidant infants had lower IQs and seemed less likely to elicit responsiveness from their infants than the mothers of secure infants. Mothers of avoidant and resistant infants tended to have negative feelings about motherhood, were tense and irritable, and showed little interest in their infants once the infants were born. These mothers did not adapt their feeding to their babies' pace and seemed to feed them mechanically, reducing opportunity for close contact or reciprocity. They avoided physical contact except when necessary.

Egeland and Farber (1984) also examined the stability of attachment and found that attachment classifications can change over time. Mothers whose infants changed from a secure to an anxious attachment classification over the second year were characterized by hostility and suspiciousness. These mothers initially had adequate caretaking skills. Egeland and Farber (1984) speculated that by the end of the second year, children have a change in the capacity and need for interaction. Children who were secure and later became insecure probably had more hostile and suspicious mothers who could no longer fulfill their needs by the end of their second year.

Some infants also changed from an insecure to a secure attachment classification. According to Egeland and Farber (1984) the increase in security of attachment appeared to reflect the mother's growth, increasing competence, and additional skills in responding to her infant's needs.

Lamb et al. (1984) were critical of Egeland and Farber (1984) noting that although their study included 60 or more tests relating maternal characteristics to the Strange Situation classifications, in no case were the same measures significantly related to both the 12 and 18 month testings. Lamb et al. (1984) stated that the results suggest no reliable or consistent relationships between maternal characteristics and security of attachment. They concluded that the study provides little insight into the antecedents of the Strange Situation behavior. In their view, more precise information might have been obtained if the maternal characteristics were assessed closer in time to the assessments of attachment security, and if the authors had included measures of variance and multiple regression procedures.

Frodi, Grolnick, and Bridges (1985) examined the relationship between maternal control style, sensitivity, childrearing attitudes, and the stability of the infant-mother attachment relationship. They observed 38 mother-infant pairs at 12 and 20 months using the Strange Situation. The results suggested that mothers who had nonpunitive childrearing attitudes had securely attached infants. These mothers were also sensitive and supportive of their infants' striving toward autonomy. On the other hand, mothers who were more punitive, more controlling, and less sensitive had insecurely attached children.

Frodi, Grolnick, and Bridges (1985) also found that the attachment relationship can change during the infant's second

year of life, similar to Egeland and Farber (1984). The second year of life is particularly important because the infant is developing a sense of autonomy. Mothers who responded to their infants' autonomy with sensitivity, positive attitudes and support facilitated a continuing secure attachment with their infants. Conversely, mothers who reacted to their infants' autonomy with less sensitivity and more punitive attitudes had infants that became insecurely attached.

Frodi, Grolnick, and Bridges (1985) also stated the importance of more subtle interactive variables for the understanding of the attachment relationship. As Lamb et al. (1985) suggested, this study shows that attachment patterns can change, especially if the mother adjusts to a child's growing automony.

In a recent study, Zaslow, Rabinovick, Suwalsky, and Klein (1988) investigated the role of social context in the prediction of secure and insecure infant attachment. They found that mothers of secure infants clearly had more playful interaction with their babies when they were alone with them than did mothers of insecure infants. Mothers of secure infants also had more playful interaction with their babies when their spouses were present than mothers of insecurely attached infants. Both mothers of secure and insecure infants showed more negative affect when alone with their infants than when their spouses were present. The authors reflected that perhaps rearing infants is difficult for all mothers but less

arduous when mothers feel supported by their spouses.

Fish and Crockenberg (1981) examined the stability of infant characteristics from birth to 9 months, and mother-infant interaction during the same time period. They did not use the Strange Situation but observed infants and mothers in their home environment and examined infants using the Neonatal Behavioral Assessment Scale. They found consistency in mother responsiveness and availability over time. Mothers who took longer to intervene when their infants cried at 3 months were less interactive at 9 months. There was no relationship between 9-month fussing and crying and mothering behavior. Mothers who were active in engaging their infants in some type of responsive interaction and contact had social babies at 9 months. Motor activity, in contrast to social activity, appears most clearly related to newborn characteristics and is least influenced by mothers' behavior.

Bohlin, Hagekull, Germer, Andersson, and Lindberg (1989) likewise studied predictive relationships between maternal behavior and infant characteristics using the Strange Situation with 116 infant-mother pairs. They assessed infants' attachment and aspects of maternal sensitivity. They found that maternal aspects of responsiveness, physical contact, and intrusiveness were statistically significant in predicting attachment. Avoidant infant behavior was predicted by maternal insensitivity and a lack of physical contact, whereas resistant infant behavior was predicted by maternal intrusiveness. Secure infants had mothers who were sensitive,

provided physical contact and were not intrusive.

Kiser, Bates, Maslin, and Bayles (1986) also studied mother-infant play at 6 months as a predictor of attachment security at 13 months. They found a relationship between early mother-infant communication in face-to-face play and later attachment security, although the relationship was of modest strength. They stressed, however, that this relationship is not easily attributable to chance.

Lewis and Feiring (1989) also tested the relationship between early infant and maternal behavior and later attachment quality. They observed 174 subjects and discovered that 3-month old infants who were less sociable (i.e., more toy- and less person-oriented) were more likely to be classified at 1 year as avoidant. Maternal stimulation at 3 months also affected later attachment classification. Mothers who gave their infants a moderate amount of stimulation at 3 months later had securely attached children. In addition, at 3 months avoidant infants received the most amount of stimulation and resistant infants had the least amount of stimulation from their mothers.

Overall, in regards to maternal characteristics that may lead to securely attached children, the research is fairly consistent, although not as strong as may be expected. Generally, mothers who are sensitive to their infants' needs and who participate in engaging, social contact, as well as physical contact, have securely attached infants. Mothers who have nonpunitive childrearing attitudes, who feel positive

about themselves, who are supportive of their children's striving toward autonomy, and who are skillful in feeding and playing with their children are also characterized as mothers with secure infants.

Prediction of Abilities and Competencies

The attachment research also addresses correlates between a child's secure attachment and the development of various abilities and competencies. This paper first addresses the overall finding that securely attached children were found to be more competent and effective in exploring their environment than insecurely attached children.

Exploratory behavior. In a classic study, Ainsworth and Bell (1970) observed 56 white, middle-class infants in the Strange Situation at approximately 12 months. They found that the presence of the mother encouraged exploratory behavior, while her absence decreased exploration and increased attachment-seeking behaviors. They interpreted their findings according to Bowlby's theory that in the presence of their mothers, infants have a secure base from which to explore the Strange Situation. This study appeared to substantiate attachment theory and was used to generate further research in the field.

Main (1983) also examined 40 white, middle class mothers and used the Strange Situation to study securely attached children. She found that the securely attached toddlers devoted their attention to the toys and other objects in the playroom more fully and intensely than the insecurely attached

toddlers. Secure toddlers also took significantly more delight in the toys, indicated by smiling or laughing about them approximately four times as freqently as the insecure children. They also spent longer in individual bouts of play with a mean duration of over 39 seconds, as opposed to 29 seconds for the insecurely attached children. There were no significant differences found on the maternal variables. Thus, a secure attachment may predict more involvement in the environment.

In another important experiment, Belsky, Garduque, and Hrncir (1984) sought to develop a measure of "executive capacity," or infants' ability to execute in a self-initiated manner, their highest level of functioning. Belsky et al. (1984) also wanted to examine the degree to which variability in the home environment and quality of attachment is related to this ability. They observed 61 children at 12 and 13 months of age.

Belsky et al. (1984) discovered that children with secure attachments seemed to experience more freedom to attend to the environment and were able to engage in more cognitively sophisticated exploration than insecurely attached children. The secure children also spontaneously deployed their cognitive competencies in free play, contrary to insecurely attached children. Belsky et al. (1984) inferred that less secure children spend time being concerned about the world surrounding them and appear less able to engage in cognitively sophisticated play and exploratory activities. Overall,

Belsky et al. (1984) have impressive findings that suggest that secure infants play more easily and spontaneously in free play situations than insecure infants, as also acknowledged by Lamb et al. (1985). Secure attachments appear to predict spontaneity in play.

Hazen and Durrett (1982) assessed children at 12 and 30 months to test the relationship between security of attachment and exploration and cognitive mapping abilities. The children were given tasks to assess their knowledge of a laboratory space. After learning a specific route through the space, they were required to invent new routes to the goal. Securely attached children explored relatively more independently and had less restricted patterns of exploration than did anxiously attached children. They also scored higher on tasks of spatial ability. Hazen and Durrett (1982) proposed that individual differences in security of attachment, mode of exploration, and cognitive mapping abilities exert mutual effects on each other throughout early development, and that security of attachment affects later competence in environmental adaptation.

Lamb et al. (1985) challenged Hazen and Durrett (1982) claiming that the study revealed ambiguous evidence. There was one major problem: The secure B1 and B4 subcategories were combined with the avoidant and resistant groups respectively, and were considered insecurely attached for purposes of analysis. Lamb et al. (1985) stated that the authors were unable to make the predictions they did regarding

the validity of the three attachment groups. It is unknown whether significant differences would have emerged if the avoidant, resistant, and secure attachment groups were compared.

Cassidy (1986) explored the relationship between attachment and a previously unexamined aspect of competence: "the ability to negotiate the environment." This includes skills such as those needed to maneuver around toys or furniture, to reach for objects without falling, and to position oneself in a comfortable position in relation to toys during play. Cassidy (1986) examined 65 babies who were 18 months old and found that those who were most securely attached had less difficulty negotiating the environment than babies who were anxiously attached. Cassidy (1986) used a one-way analysis of variance to compare the attachment groups (one secure and two insecure) and controlled for individual differences in the overall amount of exploratory behavior. Her thorough study seemed to show that a secure attachment predicts the ability to negotiate the environment.

Frodi, Bridges, and Grolnick (1985) also studied 41 mother-infant pairs for correlates of mastery-related behavior and attachment at 12 and 20 months. Mastery motivation is the innate motivation to become competent in seeking out mastery experiences in the environment by the acquisition of knowledge and skills for effective functioning. Surprisingly, the quality of attachment assesssed at 12 months failed to significantly predict either mastery motivation, competence,

or affect when tested eight months later. They explained the discrepancy by one factor, that the size of the samples were relatively small. The number of subjects in each of the attachment groups was limited. They cautioned against using this study for anything more than exploratory data. However, a comparison of the secure group to the insecure group, when combining both avoidant and resistant infants, suggested that the secure group was superior to the insecure groups on all mastery-related measures.

Summarizing the results of the studies on the correlates between securely attached children and competence or ability to explore their environments reveals differences between secure and insecurely attached children. The evidence demonstrates that securely attached children explore more in the presence of their mothers, devote more attention to and delight in their toys, spend longer in play, have more ability to be self-initiating in exploring their environment, are more independent and less restrictive in their patterns of exploration, and have less difficulty in negotiating the environment than insecurely attached children. The differences were greater when the avoidant and resistance attachment groups were combined into one group of insecurely attached children. When the groups were separated, the differences were not pronounced and failed to be significant in one of the experiments discussed.

Cognitive development. Securely attached children were found by some researchers to be more advanced in cognitive

development than insecurely attached children. For example, Arend, Gove, and Sroufe (1979) conducted a longitudinal experiment testeding 26 children to assess their security of attachment at 18 months. Their cognitive abilities, measured by ego-resiliency and ego-control scores were measured at 4 to 5 years. Ego-resiliency was defined as the ability to respond flexibly, persistently, and resourcefully in problem situations. Ego-control refers to the threshold of an individual with regard to the expression or containment of impulses, feelings, and desires. The contructs were assessed by a Q-sort procedure and a battery of laboratory procedures.

The predictions were supported by the findings. The securely attached children scored significantly higher than the anxiously attached children on the ego-resiliency and ego-control constructs. Also, as preschoolers, children who had been securely attached as infants scored higher than anxiously attached children on three independent measures of curiosity.

Arend et al. (1979) explained that they chose white, middle-class, Mid-western families which could be presumed to provide a relatively stable environment because they felt that children develop and adapt "in conjunction with" environmental support. The point was made by Lamb et al. (1985), as well as Arend et al. (1979), that it is unknown whether a secure child's superior performance on cognitive measures is related to the internalization of attachment patterns or if the performance is related to the continuation of supportive caretaking. Again, only slight differences were found between

the avoidant and resistant groups and the secure group, but a greater difference was found when the insecure groups were combined. The sample Arend et al. (1979) used seems to be limited because they chose only white, stable families for their study. For these reasons the generalizability of their study is questionable.

Matas, Arend, and Sroufe (1978) studied the relationship between quality of attachment and later competence. They also studied 48 infants from stable, middle-class, Mid-western families, as did Arend et al. (1979), and assessed them at 18 and 24 months. Infants who were assessed to be securely attached at 18 months were predicted and found to be more enthusiatic, persistent, cooperative, and, in general, more effective at 2 years than those who had been insecurely attached infants. The secure children were able to function more effectively when faced with frustration, as indicated by utilizing external assistance and refraining from excessive self-defeating behaviors, in contrast to the insecure children. These abilities are hallmarks of ego development.

Lamb et al. (1985) critiqued Matas et al. (1978) and suggested that their sample seems limited. They found little difference between the secure and either avoidant or resistant groups, and it is unclear whether the secure children's competence was a result of consistant quality of parenting or an earlier secure attachment. Generalizability is also limited. However, in spite of the problems in the study, securely attached children from middle-class families seem to

be persistent, cooperative, and utilize external assistance when needed.

Bell (1970) tested the hypothesis that differences in the rate of development of Piaget's (1954) concept of person permanence are related to the quality of attachment behavior between a baby and mother. She tested 33 babies in the Strange Situation and in their home environment, employing Piaget's test for person permanence. Bell (1970) found that securely attached infants had a positive decalage, defined as an advanced concept of the permanence of persons over inanimate objects, in contrast to the avoidant or resistant children. All but one of the secure infants showed positive decalage, and the secure infants were the only babies to evidence a positive decalage. Babies with a negative or no decalage showed little or no interest in interaction with, proximity to, or contact with the mother during the Strange Situation. Bell (1970) concluded that the development of the object concept is intimately associated with the attachment of a baby to the mother.

Bell's (1970) striking results were also critiqued by Lamb et al. (1985) who questioned the validity of her results by emphasizing that the Strange Situation classifications were based on narratives dictated and assessed solely by Bell. Therefore, according to Lamb et al. (1985), there is a substantial potential for bias. Bell was trained by Ainsworth and thoroughly followed the recommended procedures as well as presented a detailed account of her record keeping which may

lessen the potential for biased results. However, blind scoring would have been a more rigorous procedure.

Levitt, Antonucci, and Clark (1984) later attempted to replicate Bell's (1970) findings in a study involving 39 infants at 13 months. Their results provided some support for Bell's (1970) conclusion that insecurely attached infants perform at a higher level on the object permanence scale than on the person permanence scale. However, the results did not support Bell's (1970) results that secure children have a positive decalage, or more advanced person permanence over object permanence. Thus, Bell's (1970) findings were not fully confirmed.

In an interesting new study, Slade (1987) investigated the relationship between the quality of attachment and symbolic play development. Slade (1987) defined symbolic play as make-believe play or the capacity to use an object, gesture, or sound to represent an absent object or person in spontaneous play. This developmentally follows the establishment of object permanence. Slade's (1987) sample included 15 primarily Caucasian children from middle-class families in which the fathers worked and mothers served as primary caretakers. The children were assessed at 18 months using the Strange Situation and given the Bayley Scales for Infant Development. The reliability of the ratings was established by using two trained, unbiased assistants.

Slade's (1987) results confirmed that securely attached children had the longest episodes of symbolic play and that

they scored significantly higher than anxiously attached children in the planning and abstraction of their play. The frequency of play was similar between the two groups, but secure children were more persistent in their efforts at symbolic play and performed at the high end of their capacities, in contrast to insecure children. Secure children had higher levels and longer episodes of interactive play with their mothers. They seemed to derive greater benefit from maternal influence than did insecure children. Slade hypothesized that secure children are developing and using representational capacities that permit them autonomy and agency. They play independently and competently, but their play is enhanced by active engagement with their mothers.

Although Slade's (1987) sample was small and not representative, she presented interesting results that clearly show the superiority of symbolic play in secure children over insecure children. The design of her study was somewhat more rigorous than that of similar research. Her results need to be replicated before generalization is possible. However, it appears that a secure attachment may predict advanced symbolic play in children.

Cognitive development and capacities were also found to be related to the quality of attachment in studies previously reviewed in this paper. Main (1983) found that securely attached toddlers evidenced a larger vocabulary, more spontaneous verbal self-directions, more playfulness with adults, and paid more attention to the details of toys than

insecure toddlers. Belsky et al. (1984) found that securely attached children engaged in more cognitively sophisticated exploration and spontaneously used their cognitive capacities more in free play than insecurely attached children.

Van IJzendoorn and Van Vliet-Visser (1988) hypothesized that securely attached infants would perform better on an intelligence test in kindergarten than anxiously attached children. They tested 77 children and used the Strange Situation at an average age of 24 months. They then tested the children's intelligence using the Leiden Diagnostic Test (LDT) three years later. They tested Dutch children; the LDT is a standardized IQ test frequently administered to Dutch children. Van IJzendoorn and Van Vliet-Visser (1988) recruited a sample from the higher socioeconomic classes and found the mean IQ of all the children to be 111, above the average for the Dutch population at the same age which is about 100.

Van IJzendoorn and Van Vliet-Visser (1988) claimed that the securely attached group appeared to attain the highest intelligence level in kindergarten, although these results should be qualified. They combined the avoidant and resistant groups and divided the secure group into three subgroups (B1, B2 and B3 (combined), and B4). Combining the groups the way they did, gave them the desired results. They also found that resistant children performed better on the LDT than the secure children. This contradicts their hypothesis. Combining the secure (B) children together and separating the avoidant and

resistant children, changes the results. This makes interpretation of the results of this study difficult. Generalization is also questionable due to cross-cultural issues. The authors acknowledged some of these difficulties and called for a replication of their work.

In another recent experiment, Bus and Van IJzendoorn (1988) sought to study the concurrent relationship between attachment security and mother-child interactions during activities related to the acquisition of reading skills. They cited a suggestion by Lamb et al. (1985) that patterns of attachment behavior reflect the current but not necessarily the enduring or early mother-infant relationship. Bus and Van IJzendoorn (1988) hypothesized that the children of mothers who attend to their reading instruction are more advanced in reading skills. A cross-sectional design was applied with observations of children interacting with mothers.

Their results demonstrated that the atmosphere surrounding the interaction of securely attached children with their mothers was more positive than that of the anxiously attached children. In the secure group there was less need to discipline, and the secure children were less distracted than the anxiously attached children. Securely attached children followed reading instruction more readily and developed their reading capacity more easily than anxiously attached children. In light of the Lamb et al. (1985) comments, this study is different from the usual prospective or predictive attachment study because Bus and Van IJzendoorn (1988) related attachment

security and problem-situation behavior at the same age. They also commented that mothers of securely attached children may be able to demand more of their children because the children have developed trust in them.

In summary of the relationship between a secure attachment and advanced cognitive development, the research seems to indicate some differences between securely and insecurely attached children. Secure children had higher ego-control and ego-resiliency and scored higher on measures of curiosity; seemed more persistent, cooperative and generally more effective in tasks; may show more advanced person permanence (although findings were not replicated); demonstrated more advanced symbolic play; evidenced a larger vocabulary; and displayed greater ability to attend to reading instruction than insecurely attached children. Generalizability is limited on most of the studies assessing cognitive development because the samples were not representative.

Peer relationships. A child's relationship with peers has also been studied frequently in the literature in order to determine any correlations between attachment and peer relationships. Generally, securely attached children have evidenced more social relatedness with peers than insecurely attached children.

Lieberman (1977) studied the relationship between peer competence, the security of attachment, and the amount of experience with peers in 3-year-olds. She studied 40 children

and found that peer competence in preschoolers was related to both child-mother and child-peer attachment. Mothers who promoted a secure attachment with their children also were responsive to their child's need for peer relationships. These mothers provided more opportunities for peer interaction than mothers with insecurely attached children. Lieberman (1977) also found that securely attached children engaged in positive nonverbal interactions with a peer, such as sharing, giving, or showing toys. Secure children also reflected an overall more positive orientation toward others than insecure children.

However, Lieberman's (1977) conclusions are questionable due to her use of the Strange Situation for 3-year-olds when it is considered valid only for younger children. She also utilized in her data several composite measures of attachment security derived by component analysis of variables from home observations, rather than from the traditional classifications of the Strange Situation. For this reason, the exact relationship between security of attachment and peer competence is unknown and bears further study.

As mentioned previously, Waters et al. (1979) reported impressive findings concerning the relationship between the Strange Situation and peer competence. They tested the security of attachment in infancy and Q-sort assessments of personal and interpersonal competence in preschool at 3 years. Their results demonstrated a great difference between the secure and insecure groups (11 of the 12 peer competence items

distinguished the groups) that was measured two years after the childrens' classifications. The quality of attachment in infancy appears to predict competence and effectiveness in the peer group two years later.

Pastor (1981) also found that securely attached children were sociable and positively oriented toward peers, as well as mothers, as mentioned in an earlier section. The secure children related in friendly and cooperative ways toward peers and attempted to engage peers, in contrast to insecure children. Overall, securely attached children appeared more competent as toddlers than insecurely attached children.

Peer competence in 4- and 5-year-olds was observed for 40 children throughout a school year in a study by LaFreniere and Sroufe (1985). The children were representative of children from a poor, urban area and had single-parent mothers. Peer competence was assessed via teacher rankings, behavioral measures, social participation, attention structure, and social dominance. Two dimensions of peer competence were evident: (a) an affiliative dimension characterized by emotional warmth, social maturity, and peer popularity, and (b) a power dimension involving positive and negative affect and high peer status.

LaFreniere and Sroufe (1985) concluded that girls with an early secure attachment were much higher on the affiliative dimension of peer behavior than girls with an insecure attachment. The secure girls were socially outgoing, engaged their peers in more positive interactions and received

attention and esteem from their classmates in return, in contrast to anxiously attached girls and to boys. Differences in a secure attachment relationship and peer competence was only minimally supported for boys. The authors hypothesized that this may be related to boys' increased vulnerability in the poor, urban sample; to family discord, instability, and absence of a father. This indicates that secure attachments may predict social competence, at least for girls.

Easterbrooks and Lamb (1979) designed their study to determine whether different patterns of infant-mother interaction were systematically related to differences in the infants' styles of interacting with peers. They focused on the subcategories of the securely attached classification, B1 - B4, and described differences among the securely attached group. Of 21 discrete behavior measures and 3 composite measures of peer interaction, there were significant overall group differences on two of the discrete and two of the composite measures. B1 and B2 infants spent more time interacting with and being close to their peers and were more independent of their mothers compared to B3 or B4 infants. The avoidant and resistant infants were not studied. Easterbrooks and Lamb (1979) showed some differences among infants in relation to their peers and attachment to their mothers. However, it is uncertain whether group differences in peer interaction would have remained when variance attributable to differences in mother-directed behavior was partialled out.

Subsequently, Jacobsen and Wille (1986) studied 24 children in two play sessions with the same-sex, unfamiliar, and securely attached playmate. The children were Caucasian and primarily from middle to upper class families. The children were assessed at 18 months and again at 2 to 3 years. The attachment pattern at 18 months did not predict developmental changes in sociability or responsiveness to peers. Only one measure (number of positive responses) showed a difference between groups: Securely attached children scored higher than resistant or avoidant children indicating that they were more attractive to their peers than insecure children. Also, dyads in which both children were securely attached were the most interactive dyads.

In contrast to studies by Easterbrooks and Lamb (1979) and Pastor (1981), the more detailed measures of social interaction used by Jacobsen and Wille (1986) showed little relationship between security of attachment and peer interaction in toddlers. The results are difficult to interpret because of the small and biased sample size, the small number of significant effects, and the absence of clear group differences in the behavior of the children. The fact that secure children are preferred playmates does not have much predictive value.

Troy and Sroufe (1987) examined the association between preschool children's attachment and a relational pattern labeled "victimization." The 38 children were from a poor, urban population and were assessed at 12 and 18 months of age

with the Strange Situation procedure. Three or four years later, the children were assigned to dyads for observing their play and interaction. Three blind judges viewed the play sessions and utilized specific criteria for assessing victimization. In order for children to be classified as victimizers, they had to be actively exploiting or hurting the other, either physically or emotionally, without apparent empathy. Victims had to be more vulnerable by being physically weaker, for example, and appear to desire approval from the victimizer. The results demonstrated that the concept of victimization was significantly associated with an avoidant attachment history. The presence of one child with a secure attachment was associated with a nonvictimization relationship. In every case in which one member of the dyad had a history of avoidant attachment and the other member also had been insecurely attached, victimization occurred.

Troy and Sroufe (1987) hypothesized from their results that a child with an early history of consistent caregiver insensitivity, rejection, and abuse will internalize a model of being both an exploiter and being exploited. Children may organize their behavior around the expression of anger and hostility in the role of victimizer, or other times around a sense of unworthiness and a poor self-image in the role of a victim. The results of this experiment are questionable given the fact that only some of the insecure children, the avoidantly attached children, were associated with victimization. The sample was small for this group. There

appears to be a relationship between secure attachment and a lack of victimization when the child was with another secure child, although again, the sample was small. Also, the sample consisted of poor, urban families which may already be exposed to more victimization, so the generalizability of the results is questionable.

In general, there is some evidence for securely attached children having a more positive orientation toward peers, being more sociable toward peers, and overall, having more peer competence than insecurely attached children. When two secure children are together there seems to be more interaction between them and a lack of victimization. Secure children appear to be attractive to their peers. Securely attached girls are more socially outgoing and give and receive more attention from peers than insecurely attached girls and boys.

Sociability with strangers. Several investigators have studied the relationship between the Strange Situation behavior and the quality of interaction with unfamiliar adults. Main and Weston (1981) observed 61 infants in the Strange Situation at 12 and 18 months. Among other aims, they wanted to see whether security of attachment to mother and to father, considered separately and jointly, influenced sociability with new persons. To test their relatedness, children were observed in a play session with their mothers in which a clown attempted to evoke emotional reactions. The children's degree of relatedness to the clown and their

conflict behavior during the session were rated by naive coders.

Only one of the 23 secure infants showed conflict behavior, compared with 11 (56%) of the 21 avoidant and resistant infants. The secure infants were also highest in stranger relatedness, although there was no statistical test of the difference. There were no significant differences noted in relatedness or conflict between the avoidant, resistant, or unclassified insecure infants. In regards to relatedness and conflict, attachment with mothers, rather than attachment with fathers, predicted the infants' behavior with a stranger. The children who were securely attached to their mothers performed with less conflict and seemed to relate more with the stranger than the insecurely attached children.

However, children who were insecure with their mothers, but had a secure relationship with their fathers tended to have a greater readiness to establish a friendly relationship with the clown than children who were classified as insecure with both parents. From their results, Main and Weston (1981) proposed that infants can form different attachments with mothers and fathers that influence interactions with new persons. Further, negative effects of an insecure relationship with one parent can be mitigated by a secure relationship with the other.

In a critique of this study, Lamb et al. (1985) suggested that interpretations made by Main and Weston (1981) are questionable because (a) the behaviors were not rated

simultaneously, and (b) only mothers were present in the clown session. This may explain the predominance of the attachment with the mother over the father in predicting performance with the stranger. Overall, despite the problems, this study appears to provide predictive validity for the Strange Situation in demonstrating that securely attached children are more sociable with strangers than insecure children. A secure attachment may predict sociability with strangers.

Lutkenhaus, Grossmann, and Grossmann (1985) also investigated the relationship between infants' attachment at 12 months and their style of interaction with a stranger at 3 years. They tested 44 Caucasian children from middle-class families. Two independent raters used a 7-point rating scale to score the child's initial reactions to the stranger. Later, the stranger requested that the child play a competitive game with him which involved building a tower. The results indicate that secure children show greater sociability with strangers than insecure children, consistent with findings by Main and Weston (1981).

Lutkenhaus et al. (1985) also found different styles of interaction in the competitive game. Secure children tended to increase their performance speed in order to win when faced with the possibility of failure, while insecurely attached children slowed down. Potential success feedback had no differential effects. The authors speculated that secure children have the early experience of influencing the behavior of a responsive mother. This may lead secure children to have

confidence in their capacity to change potential outcomes. On the other hand, insecure children slowed down or quit because they lack the confidence that their efforts can effect a change in the outcome. The authors' hypothesis that secure children would display their sadness more openly after failing than insecure children received questionable support.

Although the sample was limited to middle-class, Caucasian families, the results support findings obtained by Main and Weston (1981) that a secure attachment may predict sociability with a stranger. Lutkenhaus et al. (1985) also proposed that secure children interact more smoothly and quickly in a competitive game with a stranger than the insecure children. It appears that secure children may have more confidence under pressure in a competitive game with a stranger than insecure children.

Thompson and Lamb (1983) also observed 43 middle-class infant and mother pairs in the Strange Situation at 12 and 19 months. Prior to each Strange Situation procedure, infants were observed in a brief standardized procedure designed to assess sociability toward strangers. At both ages, infants in the secure B1 and B2 subgroups had the highest sociability scores, whereas avoidant and resistant infants had the lowest scores, which is consistent with previous studies (Lutkenhaus et al., 1985; Main & Weston, 1981).

However, only 53% of the infants had the same attachment classification at both ages, because of a high incidence of family change. Stranger sociability scores at 12 and 19

months were highly correlated when the attachment status was consistent but the sociability scores were nonsignificantly related when the attachment classification changed over time.

In accordance with criticism by Lamb et al. (1984) of the Strange Situation procedure, Thompson and Lamb (1983) concluded that predictive validity for the Strange Situation can only be expected when attachment classification is consistent over time. Furthermore, they stated that given the occurrence of changes in family circumstances and caregiving, changes may occur in the security of attachment. Thus, the security of an attachment relationship reflects the current, and not necessarily the enduring status of the infant-mother relationship.

Lamb, Hwang, Frodi, and Frodi (1982) assessed infants' sociability with strangers in traditional and nontraditional Swedish families. They examined 51 infants in the Strange Situation at 11 and 13 months--once with their mothers and once with their fathers. Sociability toward adult strangers was assessed prior to the Strange Situation procedure. Infants who had secure B1 and B2 relationships with their fathers were significantly more sociable than those with secure B3 or B4 attachments. Lamb et al. (1982) then combined all securely attached infants (B1-B4) and found that infants securely attached to their fathers were only marginally more sociable than those insecurely attached to their fathers. Infants who were securely attached to their mothers were not significantly more sociable than those who were insecurely

attached.

Results showed surprisingly that the security of the infant-father attachment was more closely related to infant sociability than was the security of the infant-mother attachment. Previous researchers have shown that infants securely attached to mothers are more sociable towards strangers (Main & Weston, 1981) and that infants who have secure B1 or B2 relationships with their mothers are the most sociable (Thompson & Lamb, 1983).

These conflicting results may reflect the fact that fathers in nontraditional Swedish families were more involved in childcare than traditional American fathers. However, Lamb et al. (1982) stated that the mothers were also involved and the results are therefore confusing. Although the infants showed attachment to their mothers, the data revealed that the quality of the mother-infant attachment does not affect the infants' sociability in any significant way. The authors also raised the issue that the Strange Situation patterns of behavior has not been validated outside of the United States, and that perhaps the ambiguous results reflect a cultural bias.

Taken together, these studies seem to suggest that securely attached infants are more sociable in their initial encounters with adult strangers than insecure infants. Secure infants also had less conflict when with a stranger. They interacted faster and more smoothly when faced with the possibility of failing in a competitive game with a stranger.

Sociability scores were consistent when the attachment status and family circumstances were consistent over time, but sociability towards strangers may change if the attachment classification changes. Overall, children with a secure attachment were more sociable than insecurely attached children, although one study outside the United States failed to replicate this finding. Thus, a secure attachment seems to predict sociability with strangers.

Summary and Conclusion

Children with a secure attachment are positively involved with their mothers. Secure children demonstrate early positive face-to-face encounters with their mothers (Blehar et al., 1977), smile at their mothers, displaying patterns of affective sharing (Waters et al., 1979), and show an overall positive orientation toward their mothers (Pastor, 1981). Secure children also are independent of their mothers at times (Easterbrooks & Lamb, 1979) and show internalized controls as evidenced by compliance with their mother's commands (Londerville & Main, 1981).

Mothers of securely attached infants initiate encounters with their infants with playfulness and sensitivity to the infants' desire for contact (Blehar et al., 1977; Egeland & Farber, 1984; Kiser et al., 1986; Zaslow et al., 1988). These mothers feel positive about themselves, encourage reciprocity, and are skillful in feeding and playing with their infants (Egeland & Farber, 1984; Fish & Crockenberg, 1981). Mothers

of secure infants also have non-punitive childrearing attitudes, are supportive of their child's striving toward autonomy, and are not intrusive (Bohlin et al., 1989; Frodi, Grolnick, & Bridges, 1985).

The research indicates that attachment is not constitutionally based. The interaction between a mother or father and child is critical in development of a child's secure attachment. However, it appears that the mechanics of feeding and caring for an infant are not enough to form a secure attachment. Children need relatedness and they also need mothers who are sensitive to their growing need for separateness and autonomy in order to be secure. The research emphasizes the importance of the mother's consistent behaviors in shaping attachment patterns.

A secure attachment at an early age seems to predict certain competencies and abilities. In terms of exploring the environment, a secure attachment appears to predict that infants will play spontaneously and comfortably in free play (Belsky et al., 1984). Secure infants also play intensely and take delight in their toys (Main, 1983), and are independent and able to negotiate their environment with ease (Cassidy, 1986; Hazen & Durrett, 1982).

Secure infants seem to have advanced cognitive development. Infants with secure attachments are able to respond flexibly, resourcefully, and persistently in problem situations (Arend et al., 1979). They are able to handle frustration through containing their impulses and by utilizing

external assistance (Matas et al., 1978). During play they are able to plan and utilize representational capacities that allow them freedom and creativity (Slade, 1987). They evidence positive decalage in that they are advanced in the concept of the permanence of persons over inanimate objects, although this finding was not replicated (Bell, 1970; Levitt et al., 1984). They tend to have a large vocabulary and are spontaneous in verbal, self-directions (Main, 1983). Such infants also develop their reading capacity easily in the presence of their mothers (Bus & Van IJzendoorn, 1988).

In regards to peer relationships, a secure attachment appears to predict later competence and effectiveness with peers (Waters et al., 1979). Secure children have an overall, positive orientation toward peers and attempt to engage peers in friendly and cooperative interaction (Lieberman, 1977; Pastor, 1981). Girls with secure attachments are socially outgoing and receive attention and esteem from classmates (LaFreniere & Sroufe, 1985). Securely attached children relate to peers in nonvictimizing relationships and are generally attractive to their peers (Jacobson & Wille, 1986; Troy & Sroufe, 1987).

Finally, a secure attachment may predict sociability with strangers (Lutkenhaus et al., 1985; Main & Weston, 1981; Thompson & Lamb, 1983). Secure infants relate to strangers with a minimum of conflict behaviors, especially those with a secure attachment to their mothers (Main & Weston, 1981), although there is some evidence that a secure relationship

with a father may influence sociability (Lamb et al., 1982). Secure children may be confident under pressure situations such as during a competitive game with a stranger (Lutkenhaus et al., 1985).

Overall, an early secure attachment seems to predict several types of competency as well as sociability with others. Securely attached children are able to be involved in their environment, making use of their cognitive and creative capacities as toddlers. They show some advanced cognitive development and are generally less frustrated and able to concentrate on learning. They enjoy and interact sociably with both peers and strangers. There is some indication that these competencies and abilities are maintained only in the presence of consistent and enduring secure attachments. In any case, the evidence is too convincing to attribute to chance: A secure attachment appears to be related to high levels of capacities, advantages in development, and expansion of children's abilities and horizons.

In conclusion, the research seems to demonstrate that there are differences between securely attached and insecurely attached children. However, there does not appear to be clear differences between the avoidant and resistant classifications, contrary to the findings of Ainsworth et al. (1978). When studied independently, the avoidant and resistant groups were often small and did not reflect significant results. On the other hand, when the avoidant and resistant classifications were combined as the insecure group,

clearer differences were obtained. Therefore, it is questionable whether there are true distinctions between the avoidant and resistant classifications. Future research testing for the validity of these classifications may prove helpful.

Likewise, utilizing the secure subgroups B1-B4 failed to give consistent results among the different studies discussed in this paper. Some researchers (Easterbrooks & Lamb, 1979; Hazen & Durrett, 1982; Lamb et al., 1982; Thompson & Lamb, 1983; Van IJzendoorn & Van Vliet-Visser, 1988) attempted to combine subgroups but obtained inconsistent and ambiguous results. It seems likely that there are no distinct differences between the B1-B4 secure subgroups.

Lamb et al. (1985) questioned the validity of the Strange Situation. Contrary to assertions by Lamb et al. (1984), the empirical evidence included in this paper seems to support Ainsworth's (1978) hypothesis that securely attached infants have more responsive and sensitive caretakers than insecurely attached infants. Although there seems to be an absence of clear differences between the avoidant and resistant groups, it appears that there are differences between the secure and insecure classifications. Recent studies (Gaensbauer et al., 1985; Goossens et al., 1986) also support the notion that the Strange Situation behavior appears to be influenced by prior patterns of mother-infant interaction in the home environment. Thus, the Strange Situation appears to be a valid methodological procedure for assessing the quality of prior

and/or current infant-mother attachments.

The empirical research in this paper also supports the predictive validity of the Strange Situation classifications. The hypothesis that securely attached children performed better and were more social than insecurely attached children was substantiated by many studies. The association between attachment and child performance was consistent in the research. The hypothesis that securely attached infants performed better than the speecific categories of avoidant or resistant infants was not clearly established.

Lamb et al. (1985) hypothesized that any effects of early patterns of interaction are maintained by consistency in the quality of contemporaneous care. One of the important implications from this hypothesis is that when rearing conditions change, early influences may have little or no predictive value. This is in contrast to attachment theory. Recent studies (Egeland & Farber, 1984; Frodi, Grolnick, & Bridges, 1985) reported changes in attachment relationships over time, and appear to support the hypothesis of Lamb et al. (1985). Overall, there are not many studies regarding the stability of attachment classifications over time when rearing conditions change. Future research focused on the relationship between the stability of attachment and family changes would be helpful in determining whether attachment is related to early or contemporaneaous patterns of interaction.

Lamb (1987) suggested that many attachment studies have utilized poor designs which did not allow for measuring

attachment and outcome at two different ages. Lamb (1987) accurately stated that a more complex design is necessary in order to conclude that differences in attachment actually account for different outcomes. Attachment researchers have predominantly used simple correlational designs, and definite conclusions regarding attachment relationships cannot be determined from the results of such experiments. This is one reason why attachment research findings often lack clarity and consistency. Future studies using designs such as Lamb (1987) suggested, and using more complex analyses may prove helpful in clarifying attachment differences and the predictive value of attachment quality.

However, in spite of controversial issues in attachment research and differences among researchers, the evidence supporting a relationship between maternal behaviors and infant characteristics cannot be negated. The research also overwhelmingly supports a relationship between abilities and competencies and a secure attachment. The relationships cannot simply be attributed to chance.

The implications of these findings are widespread. Many popular books have been written and are currently being written that utilize the results of attachment research. Parents are interested in developing and maintaining healthy interactions with their children. Most parents want their children to have a secure attachment and avail themselves of the abundance of information in parenting books. More than ever, the public seems anxious to obtain information on

childrearing. Responsible use of the literature by authors of books meant for popular consumption will take into account both the dominant trends in the research and the methodological limitations.

Research results available to date do not provide step-by-step instruction regarding how parents can guarantee a secure attachment in their infants. However, the results do shed light on the characteristics of mothers and children who tend to develop such attachments. Likewise, the research does not provide assurance that a secure attachment will cause future competencies in cognitive and seocial development. Yet, the research does indicate that parents who are successful in engendering a secure attachment in their infants also foster cognitive and social behavior beneficial to their children's development. Future research is needed to refine both theory regarding mother-infant attachment and application to parenting.

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